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Man May 'Program' Progeny Before He's Morally Ready

THE MOST far-reaching scientific advances since World War II have been in the new field of molecular genetics. Their influence on practical human biology does not yet begin to match their revolutionary impact on the theory of life.

Our new understanding of viruses rests directly on the biochemistry of nucleic acids and we are on the verge of a really thorough insight into immunology for the first time, and with this the solution to practical problems of organ transplantation. Medically useful advances in such fields as congenital diseases, cancer and aging can be realistically predicted as the next future steps.

However, none of these steps has aroused the kind of panic that surrounds the idea of "engineering the genetic constitution of human beings." A foreboding of doom may be necessary to stimulate 20th century men to take the steps, mainly self-educational, that we need for prudent management of genetic engineering. These anxieties may help us keep a proper perspective on biological policy as a concern on a par with military, economic and geopolitical decision-making.

THE NOURISHMENT of irrational fears, however, is not the best backdrop for long-term policy decisions in any of these areas. Anxiety is most clearly irrational and most predictably evoked by rapid change itself rather than by tangible impairments of the quality of human life. These we often tolerate, when they grow gradually, to the point of utter suffocation.

Our present knowledge of the chemistry of the gene furnishes ample theoretical support for this kind of engineering. Even without such theory, we could point to everyday laboratory experiments that effect the same results in certain microbes.

Furthermore, it has recently been possible to demonstrate the complete process

of gene replication in the test tube. In the presence of carefully prepared enzyme extracts isolated from bacteria, nucleic acids from viruses or from other bacteria can be accurately copied, just as they are in the normal process of cell division.

A number of scientists have begun to comment on the potential human impact of these scientific developments. They properly raise the question once again whether man has yet advanced morally to the level where he can manage his scientific and technological accomplishments. This is an ancient question, as we see from the myths of the forbidden tree in Eden, of Prometheus or of the Tower of Babel.

DR. MARSHALL W. NIRENBERG, biochemist at the National Institutes of Health, is renowned for his brilliant direct attack on the genetic code. This has given an explicit solution to a problem that had earlier been predicted to take another 25 years. Today most of the 64 code words have been translated and many different forms of life have been proven to read the code in the same way.

In an editorial comment in Science magazine, Dr. Nirenberg echoes the prediction that tissue "cells will be programmed with synthetic messages within 25 years . . . Man may program his own cells long before he will be able to formulate goals and long before he can resolve the ethical and moral problems which will be raised."

He then cautions that man "must refrain from doing so until he has sufficient wisdom to use this knowledge for the benefit of mankind." His main purpose is not to alarm but to stimulate wider perception of molecular biology: "Only an informed so-

ciety can make decisions wisely."

These remarks deserve the widest discussion. The first step in constructive self-education is a more specific critical foresight as to the substantial dangers of misapplied biology. We also have to ask whether we might be imperiled by a policy that is too cautious and overpoliced. And we must inquire whether we are not already deeply involved in biological engineering and should therefore move the focus of our concerns from an uncertain future to present reality.